CLAIMS:

1. A method of forming a diffractive authentication device which generates an optically variable image which varies according to the angle of observation, the method comprising the steps of:

providing a primary pattern which encodes a latent image, the primary pattern having a plurality of image elements; and

providing a corresponding secondary pattern which will decode the primary pattern to allow the latent image to be observed when the primary and secondary patterns are in at least one registration, wherein the secondary pattern is provided by a diffraction grating microstructure having a plurality of each of at least two different types of diffraction elements,

wherein the primary pattern is provided such that predetermined image elements of the primary pattern render diffraction effects from predetermined diffraction elements of the diffraction grating microstructure optically ineffective at least at one observation angle when the authentication device is illuminated with a light source to thereby enable the latent image to be observed.

2. A method as claimed in claim 1, comprising overlaying the primary pattern on the secondary pattern.

3. A method as claimed in claim 1, comprising rendering portions of the microstructure optically ineffective to form the primary pattern.

4. A method as claimed in claim 1, comprising printing the primary pattern on top of a background microstructure.

5. A method as claimed in claim 4, comprising printing said primary pattern on a foil surface.

6. A method as claimed in claim 4, comprising printing said primary pattern on a photosensitive layer overlying said microstructure.

7. A method as claimed in claim 1, comprising providing said at least two types of diffraction grating regions in a regular pattern.

8. A method as claimed in claim 7, comprising arranging said at least two types of diffraction grating regions into pixellated diffraction grating regions.

9. A method as claimed in claim 7, comprising arranging said at least two diffraction grating regions into track-like diffraction grating regions.

10. A method as claimed in claim 8, comprising arranging a plurality of two different types of diffraction grating regions in a rectangular array so that they alternate in each of the horizontal and vertical axes.

11. A method as claimed in claim 1, comprising producing the diffraction grating microstructure by electron beam lithography.

12. A method as claimed in claim 1, comprising producing the diffraction grating microstructure by laser beam interference.

13. A method as claimed in claim 2, comprising providing the primary pattern upon a transparent substrate, providing the secondary pattern in the form of a foil-based diffractive optical variable device (OVD), and aligning the primary pattern with the OVD Secondary pattern in correct register such that the image elements

of the latent image encoded in the primary pattern is observable as having different visual values at certain viewing angles when illuminated with a light source.

14. A method as claimed in claim 2, comprising providing an OVD foil encoded with a secure generic optical variability effect, overlaying a primary pattern encoded with image information specific to a particular latent image in such a way that the latent image disappears upon delamination of the film from the document.

15. A method as claimed in claim 3, comprising ablating the diffraction grating microstructure at selected locations within the OVD area corresponding to the primary pattern.

16. A method as claimed in claim 1, comprising producing said primary pattern using a modulated digital image technique.

17. A method as claimed in claim 16, comprising selecting said technique from the group of SAM, μ-SAM, PHASEGRAM, TONAGRAM and a BINAGRAM.

18. A diffractive device which generates an optically variable image which varies according to the angle of observation, the diffractive device comprising:

a primary pattern which encodes a latent image, the primary pattern having a plurality of image elements; and

a corresponding secondary pattern which will decode the primary pattern to allow the latent image to be observed when the primary and secondary patterns are in at least one registration, wherein the secondary pattern is provided by a diffraction grating microstructure having a plurality of each of at least two different types of

diffraction elements, and

wherein the primary pattern is provided such that the predetermined image elements of the primary pattern render diffraction effects from predetermined diffraction elements of the diffraction grating microstructure optically ineffective at least at one observation angle when the authentication device is illuminated with a light source to thereby enable the latent image to be observed.

19. A diffractive device as claimed in claim 18, wherein said primary pattern is overlaid on the secondary pattern.

20. A diffractive device as claimed in claim 18, wherein the primary pattern is provided by rendering portions of the microstructure optically ineffective.

21. A diffractive device as claimed in claim 18, wherein said primary pattern is provided by being printed on top of a background microstructure.

22. A diffractive device as claimed in claim 18, wherein said at least two types of diffraction grating regions form a regular pattern.

23. A diffractive device as claimed in claim 22, wherein said regular pattern is a pixellated pattern.

24. A diffractive device as claimed in claim 22, wherein said regular pattern is a track-like pattern of diffraction grating regions.

25. A diffractive device as claimed in claim 23, wherein a plurality of two different types of diffraction grating regions are arranged in a rectangular array so that they alternate in each of the horizontal and vertical axes to thereby form a checkerboard pattern.

26. A diffractive device as claimed in claim 18, comprising two different types of diffraction elements.

27. A diffractive device as claimed in claim 19, wherein the primary pattern is provided upon a transparent substrate, and the secondary pattern is provided in the form of a foil-based diffractive Optical Variable Device (OVD), the primary pattern being aligned with the OVD secondary pattern in correct register such that the image elements of the latent image encoded in the primary pattern are observable as having different visual values at certain viewing angles when illuminated with a light source.

28. A diffractive device as claimed in claim 27, wherein the image elements are transparent and opaque.

29. A diffractive device as claimed in claim 27, wherein the image elements are transparent or coloured

30. A diffractive device as claimed in claim 27, wherein the OVD foil is encoded to produce a secure generic optical variability effect and the overlaid primary pattern is encoded with image information specific to a particular latent image.

31. A diffractive device as claimed in claim 20, wherein the diffraction grating microstructure is ablated at selected locations determined by the primary pattern.

32. A diffractive device as claimed in claim 21, wherein said secondary pattern is formed on an OVD foil.

33. A diffractive device as claimed in claim 32, wherein the primary pattern information is printed on top of said OVD foil.

34. A diffractive device as claimed in claim 23, wherein said OVD foil incorporates a photosensitive layer above a metallised layer which provides the secondary pattern, whereby the primary pattern can be printed by selective irradiation of the photosensitive layer.

35. A diffractive device as claimed in claim 18, wherein said primary pattern comprises a modulated digital image.

36. A diffractive device as claimed in claim 35, wherein said modulated digital image is one of a SAM image, μ-SAM image, a PHASEGRAM, a TONAGRAM or a BINAGRAM.

37. A diffractive device as claimed in claim 18, which constitutes a diffractive authentication device.

38. A diffractive device as claimed in claim 18, which constitutes a novelty item.

39. A document or instrument incorporating a diffractive device as claimed in claim 18.

40. A diffractive device as claimed in claim 18, wherein the primary and secondary patterns are constructed such that a first image is observable at at least a first angle of view and a second image is observed at at least a second angle of view.

41. A diffractive device as claimed in claim 40, wherein said first image is an image of a person.

42. A diffractive device as claimed in claim 41, wherein said second image is an image of a logo, a coat of arms or the like.

43. A diffractive device as claimed in claim 41, wherein said second image encodes data.

44. A diffractive device as claimed in claim 43, wherein said second image is a bar code.

45. A diffractive device as claimed in claim 40, wherein both the first and second images encode data.

46. A diffractive device as claimed in claim 45, wherein both the first and second images are bar codes.